

NN 608 HZ00C Geostationary
Lightning Mapper GLM GOES-R
Attachment I Health and
Safety Plan

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Geostationary Operational Environmental Satellite
(GOES)
GOES-R Series
Geostationary Lightning Mapper (GLM)

Health and Safety Plan

NN608HZ00C
ATTACHMENT I

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APPROVALS

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PREFACE

This document is submitted to satisfy the requirements of Request For Proposal (RFP) NNG07184919R, through Amendment 3 and GLM model contract, NNG08HZ00C. Objective evidence of plan implementation, training, and evaluation are available to the customer for verification upon request. For the purpose of this document, requirements levied on are applicable to Lockheed Martin and all of the subcontractors under this contract. This SH Plan will be updated as required to address all phases of the GLM Program.

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OVERVIEW

The Geostationary Lightning Mapper Imager (GLM) Program operates within a comprehensive Environmental Health and Safety (ESH) management system. This management system includes policies, procedures, and practices to assure Lockheed Martin and its partners remain in compliance with Federal, State, Regional, and Local ESH requirements.

The SH Plan presents the organizational structure and processes that are set in place to ensure the safety and health of the public, NASA employees, all LMSSC employees and guests who visit or work in LMSSC owned or operated facilities. This core program represents the minimum elements that will be maintained by all contractors and their subcontractors.

This SH Plan encompasses the requirements of Public Law 91-596, the Williams-Steiger Occupational Safety and Health Act of 1970. In addition, this SH Plan encompasses applicable elements of the Code of Federal Regulations (CFR) Title 29, Labor; CFR Title 49, Transportation; the applicable state regulations for each site of LMSSC; and the NASA policies and procedures as specified in the contract. LMSSC shall meet or exceed the requirements of the above documents, in the latest revision.

Monthly health and safety report using NASA Incident Reporting Information System (IRIS). Specify incidents, disabling injuries, lost work days incident rate, days lost, property damage cost, man-hours worked/month, and total employees. On an annual basis provide to Code 250 Safety Office a safety and health report which will include: self assessment survey of safety and health program, current EMR, RIR and TRIR rates provided directly from the insurance carrier.

(b) Reporting. The immediate notification and prompt reporting required by paragraph (d) of NFS clause 1852.223-70 shall be to the Goddard Space Flight Center Safety and Environmental Division, Code 250, Tel 301-286-6296 and to the Contracting Officer. This should be a verbal notification and confirmed by FAX or E-Mail. This notification is also required for any unsafe or environmentally hazardous condition associated with Government-owned property that is provided or made available for the performance of the contract.

SCOPE

This LMSSC SH Plan, in accordance with NPG 8715.3A Appendix E, applies to the contractual performance onsite at GSFC and to all off-site facilities occupied by LMSSC personnel in the performance of the GLM contract. The GLM team is comprised of LMSSC as the prime contractor and additional key subcontractors whose subcontract value is expected to exceed \$500,000 including commercial services and services provided in support of a commercial item. To ensure consistent implementation of safety and health programs, LMSSC requires all team members to comply with the LMSSC SH Plan via a line item in the subcontracting agreement. In addition, the agreement will include a statement that LMSSC reserves the right to verify subcontractor compliance by conducting periodic audits as necessary.

Monthly health and safety report using the NASA Incident Reporting Information System (IRIS) is supplied in compliance with the contract requirements. Specify incidents, disabling injuries, lost work days incident rate, days lost, property damage cost, man-hours worked/month, and total employees is included. On an annual basis, the GLM program will provide to the NASA/GSFC Safety Office a safety and health report which will include: self assessment survey of safety and health program, current EMR, RIR and TRIR rates provided directly from the insurance carrier.

Also the immediate notification and prompt reporting required by paragraph (d) of NFS clause 1852.223-70 shall be to the Goddard Space Flight Center Safety and Environmental Division, Code 250, Tel 301-286-6296 and to the Contracting Officer. This will be a verbal notification and confirmed by FAX or E-Mail. This notification is also required for any unsafe or environmentally hazardous condition associated with Government-owned property that is provided or made available for the performance of the contract.

Applicable Documents

Any LMSSC document listed below will be provided upon request to the customer.

NFS 1852.223-73	Safety and Health Plan
Z5 U.S.C. Section 7903	Protective Clothing and Equipment
CFR Title 29	Code of Federal Regulations (CFR), Labor
29 CFR 1910.1200	Hazard Communication
29 CFR Part 1910	Occupational Safety and Health Standards CFR Title 40
CFR Title 49	Code of Federal Regulations (CFR), Transportation
CPS-015	LM Corporate Policy Statement - Environment, Safety & Health
EG3.8.4 – G2	Product Protection Guidebook
1.3.3-T1-ESH-1.0-D	Environment, Safety and Health Directive
1.3.3-T1-ESH-1.0-P	Environment, Safety, and Health Management Systems
E2.70-2	Personal Protective Equipment and Safety Apparel
E2.70-2a	Safety Regulations Governing Apparel
E2.71-2	Identification, Reporting and Correction of Occupational Hazards
1.3.3-T1-ESH-69.0-S	ESH Self Assessment
E2.73-1	Explosive Materials Acquisition, Possession and Use
E2.75-2	Hazardous Material Business Plan
1.3.3-T1-ESH-59.0-S	Radioactive Material Safety
1.3.3-T1-ESH-82.0-S	X-Ray Machine Safety
E2.76-3	Control of Laser Equipment and Nonionizing Radiation Machines
1.3.3-T4-ESH-61.0-G	Regulatory Agency Inspection Protocol
1.3.3-T1-ESH-2.0-S	Air Quality Program
1.3.3-T1-ESH-54.0-S	Pollution Prevention
1.3.3-T1-ESH-75.0-S	Toxic Substances Control Act Compliance
3.6-T1-SysSaft-3.1-P	Mishap and Near Miss Reporting
OSH	LMSSC Occupational Safety & Health Standards
1.3.3-T1-ESH-35.0	Injury Illness Prevention Program

1.3.3-T1-ESH-18.0-S	Monthly/Quarterly Self Inspection
OSH 1.2	General Occupational Safety and Health Committee
1.3.3-T1-ESH-73.0-S	Standard Injury Illness Reporting
1.3.3-T1-ESH-40.0-S	Control of Hazardous Energy (Lockout/Tagout)
OSH 1.5	Safety Training
1.3.3-T1-ESH-81.0-S	Working Alone
OSH 1.8	Biohazards and Bloodborne Pathogens
1.3.3-T1-ESH-59.0-S	Radioactive Material Safety
OSH 2.2	Control of Radiation Machines
OSH 2.3	Control of Lasers
OSH 2.4	Control of RF/Microwave Equipment
OSH 2.5	Control of Ultraviolet Radiation
OSH 3.1	Industrial Solvents
OSH 3.2	Chemical Processing
OSH 3.3	Potting and Adhesive Compounds
1.3.3-T1-ESH-49.0-S	Oxygen-Deficient and Oxygen-Enriched Atmospheres
OSH 3.4	Cryogenic Fluids and Oxygen Deficient Atmospheres
OSH 3.5	Beryllium
OSH 3.6	Hydrazine Fluids
OSH 3.7	Fuming Nitric Acids & Oxides of Nitrogen
OSH 3.8	Teflon
1.3.3-T1-ESH-41.0-S	Liquefied Petroleum Gases
OSH 3.11	Laboratory Safety
OSH 3.12	Hazard Communication Program
1.3.3-T1-ESH-8.0-S	Compressed Gas Safety
OSH 3.14	Handling of Explosive Materials
OSH 3.15	Movement of Hazardous Substances
OSH 3.16	Hazardous Materials Storage
OSH 3.17	Chemical Spills
OSH 3.18	Toxic Gases
1.3.3-T1-ESH-24.0-S	Emergency Eyewash and Showers
OSH 3.20	Pesticide Application
OSH 4.1	Pressure Systems- General

OSH 4.2	Pressure Equipment Design
OSH 4.3	Vessels and Tanks
OSH 4.4	Pressure Gauges
OSH 4.5	Flexible Pressure Hose Assemblies
OSH 4.6	Pressure Plumbing
OSH 4.7	Relief Devices
OSH 4.8	Completed Pressure Systems
OSH 5.0	Hazard Assessment for Personal Protective Equipment
1.3.3-T1-ESH-63.0-S	Respiratory Protection Program
OSH 5.2	Eye and Face Protection
1.3.3-T1-ESH-47.0	Noise and Hearing Conservation
1.3.3-T1-ESH-9.0-S	Confined Space Entry
1.3.3-T1-ESH-25.0-S	Fall Protection
1.3.3-T1-ESH-26.0-S	Portable Hand and Power Tools
1.3.3-T1-ESH-19.0-S	Mobile Cranes
1.3.3-T1-ESH-1.0-S	Accessory Hoisting Equipment
OSH 6.4	Abrasive Grinding Wheels
OSH 6.5	Floor Loading Signs
OSH 6.6	Color Code Floor Markings
1.3.3-T1-ESH-38.0-S	Ladder Safety
OSH 6.11	Shelves and Racks
OSH 6.12	Air Guns
OSH 6.14	Vehicle Regulations
OSH 6.15	Powder Actuated Tools
1.3.3-T1-ESH-25.0-S	Fall Protection
OSH 6.17	Elevating Work Platforms
OSH 6.18	Ventilation
OSHJ 6.19	Welding Operations
1.3.3-T1-ESH-17.0-S	Ergonomics
1.3.3-T1-ESH-11.0-S	Contractor Safety
1.3.3-T1-ESH-4.0-S	Storage Battery Safety
1.3.3-T1-ESH-36.0-S	Powered Industrial Truck Safety
OSH 7.1	Electrical Safety

OSH 7.2	General Desk and Board Electrical Practices
OSH 7.3	Electronic Consoles
OSH 7.4	Facilities Design and Maintenance Requirements
OSH 7.5	Safe Practices
OSH 7.6	High Voltage Electrical Safety
AFSPCMan 91-710	Range Safety User Requirements Manual
Fed Std 313D	Federal Standard 313D Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities
FPs	Functional Procedures
FP-ESH-01	Environment, Safety and Health
NASA-STD-8719.7	Facility System Safety Guidebook
NPD 8700.1	NASA Policy for Safety and Mission Success
NPG 8715.3A	NASA Safety Manual
3.6-T1-SysSaft-3.1-P	Mishap and Near Miss Reporting
Public Law 91-596,	The Williams-Steiger Occupational Safety and Health Act of 1970, as amended
Safety at LMSSC-MSO, booklet prepared by Occupational Safety & Health	
LMSSC Supervisor Safety Manual	
LMSSC Job Hazard Analysis for Supervisors and Line Managers	
Space Systems Environment, Safety and Health Management System Manual	

1.0 MANAGEMENT LEADERSHIP AND EMPLOYEE PARTICIPATION

1.1 Policy

Corporate Policy Statement (CPS)-015 Environment, Safety and Health

Lockheed Martin Corporation (LMC) is committed to conducting its operations in a manner that provides safe and healthful working conditions for employees, contractors and visitors, protects the environment and conserves natural resources. Accordingly, Lockheed Martin will:

- Institute ESH management systems that minimize risk, ensure ongoing compliance with applicable laws and regulations, and promote continual improvements of ESH performance and management systems;
- Integrate ESH considerations into business operations, including but not limited to: product design, services, procurement, manufacturing, supplier selection, and property upgrade/renovation/rearrangement.
- Share ESH best practices and lessons learned among Lockheed Martin business units and entities;
- Ensure that employees are aware of ESH responsibilities in their jobs and encourage every employee to take responsibility for ESH performance;
- Respond to employee, community, customer and regulatory agency concerns regarding potential ESH impact from Lockheed Martin operations, as appropriate; and
- Participate in public policy processes to promote the development of ESH laws and regulations that are protective of human health and the environment and consistent with sound science and risk assessment principles.

1.3.3-T1-ESH-1.0-D Environment, Safety and Health Directive and 1.3.3-T1-ESH-1.0-P Environment, Safety, and Health Management Systems

LMSSC provides a safe workplace, protects the environment, and ensures safe products and services for its personnel and Customers, in compliance with applicable standards, laws, regulations, and contractual requirements.

LMSSC's corporate policy statement meets the intent of the policies of both NASA and OSHA, however; a better correlation occurs when you include in the comparison 1.3.3-T1-ESH-1.0 D Environment, Safety and Health Directive, 1.3.3-T1-ESH-1.0-P Environment, Safety, and Health Management Systems, and the LMSSC Supervisor Safety Manual.

1.2 Goals and Objectives

LMSSC's primary goal is to prevent/reduce injuries to the public and personnel. Each business unit's safety performance is evaluated based on the number, type, and severity of injuries recorded. The metrics used to keep track of these incidents are the OSHA Recordable Case Rate, and Lost Workday Case Rate. LMSSC's goal is to reduce the number of incidents by an average of 20% per year. With the ultimate objective to drive these values to zero.

The objectives of LMSSC's ESH Program are to provide a safe workplace, protect the environment, and ensure safe products and services for its personnel and Customers, in compliance with applicable standards, laws, regulations, and contractual requirements. Essential program philosophies include:

- Evaluation of ESH programs using the ESH Management System at least annually. This includes the development of requirements, objectives, policies, and procedures to ensure the meeting of goals.
- Ensure the safety of the LMSSC workforce. Maintain facilities in such a manner that satisfies all regulatory/code requirements.
- Review and evaluate new or modified equipment, processes, procedures, and substances for safety prior to operation. Ensure that all applicable SH standards are being fully met, and that an inspection of the process has determined that the process is safe.
- Observe all applicable safety standards issued by the Occupational Safety and Health Administration (OSHA) pursuant to Section 6 of Public Law (PL) 91-596 (the Occupational Safety and Health Act of 1970 as amended). 29 U.S.C. Section 655. Review proposed new or revised governmental standards, regulations, and laws. Where appropriate, initiate or support efforts to modify or remove standards or regulations that would not increase employee safety, would increase costs, or are unreasonable or unworkable.
- Ensure safety education, qualification/certification, and training programs are provided consistent with applicable laws and regulations. Periodically review the programs for compliance with regulatory requirements.
- Report and investigate injuries, illnesses, and accidents, and significant near-misses in the workplace, without retribution to the employees, with emphasis on understanding not only what and why the event happened, but also understanding the underlying root-causes which allowed the unwanted sequence of events to occur. Implement corrective action to prevent occurrence.

The status of the ESH program is reevaluated at least once a year via the ESH Management System. That process starts with a Risk Assessment of each program. Those programs listed as high risk for non-compliance drive the development of objectives to improve those programs. This is a dynamic process that ensures compliance with new or revised regulations. Please refer to Section 1.8 for a more detailed description of the LMSSC ESH Management System, and Figure 1, which depicts how the LMSSC ESH program implements performance criteria of the Performance Evaluation Profile (PEP).

1.3 Management Leadership

Managers and supervisors have the primary responsibility for maintaining a safe and healthful workplace for their employees and for ensuring that their operations are conducted in a manner that protects the environment. The Program Manager has the primary responsibility for Safety and Health.

1.3.1 LMSSC Policies

LMSSC has developed a series of Command Media which provide the controlling documentation for implementing a successful program. A subset is provided below:

1.3.3-T1-ESH-1.0-D	Environment, Safety and Health Directive
1.3.3-T1-ESH-1.0-P	Environment, Safety, and Health Management Systems
E2.70-2	Personal Protective Equipment and Safety Apparel
E2.70-2a	Safety Regulations Governing Apparel
1.3.3-T1-ESH-73.0-S	Standard Injury Illness Reporting

E2.71-2	Identification, Reporting and Correction of Occupational Hazards
1.3.3-T1-ESH-69.0-S	ESH Self Assessment
E2.73-1	Explosive Materials Acquisitions, Possession and Use
E2.75-2	Hazardous Material Business Plan
1.3.3-T1-ESH-59.0-S	Radioactive Material Safety
1.3.3-T1-ESH-82.0-S	X-Ray Machine Safety
E2.76-3	Control of Laser Equipment and Nonionizing Radiation Machines
1.3.3-T4-ESH-61.0-G	Regulatory Agency Inspection Protocol
1.3.3-T1-ESH-2.0-S	Air Quality Program
1.3.3-T1-ESH-54.0-S	Pollution Prevention
1.3.3-T1-ESH-75.0-S	Toxic Substances Control Act Compliance
3.6-T1-SysSaft-3.1-P	Mishap and Near Miss Reporting

Program Managers are ultimately responsible for their Program's Safety and Health Program.

The above procedures along with this Safety and Health plan provide the implementation of an effective Safety and Health program.

The Responsible Area Superintendent (RAS) Program has been implemented as a result of lessons learned and is administered by the Vice President of Technical Operations and the Director of the Test Department. The RAS program is an effort to ensure that clear, single point ownership and accountability exists for all Space Systems Company operational areas that process critical, high value and flight hardware. The RAS is the single point of contact responsible for the assigned area. The RAS coordinates all aspects that might impact the safety of personnel and hardware in the area of responsibility.

1.4 Employee Involvement

Employees are encouraged and expected to report unsafe or unhealthy conditions to their management. Work Safe, \$afety Pays program is one means of rewarding and encouraging employee participation in safe work practices and maintaining safe work environments. Employees may, with no fear of reprisal, recommend or request safety inspections should they feel such action is warranted.

All employees are responsible for the following:

- Performing at all times, in a manner to ensure maximum safety to self, fellow workers, the public, and the environment and to minimize property loss or damage.
- They have the freedom and authority to:
- Identify and record any problems relating to the product, process, or Quality System;
- Suspend operations, recommend, or provide solutions;
- Verify the implementation of solutions;
- Control further processing, delivery, or installation of nonconforming products until the deficiency or unsatisfactory condition has been dispositioned.

- Accepting and demonstrating responsibility for their own and others' safety by not attempting work that they do not feel qualified for or physically able to perform.
- Attending annually scheduled SH training.
- Performing assigned work according to proper ESH practices and procedures as posted, instructed and prescribed, including the use of Personal Protective Equipment (PPE).
- Obtaining specific instructions and/or clarifications from the supervisor or manager before proceeding with assigned work in situations where an ESH requirement or procedure is not completely understood.
- Observing and adhering to all warning signs, signals, and notices.
- Promptly reporting hazards observed.
- Immediately reporting work-related injuries, mishaps, exposures, illnesses, and incidents.
- Assisting in ESH inspections as required.
- Understanding emergency response, notification, and evacuation procedures; hazardous materials and chemicals requirements; and safety risks of operations in area of responsibility.
- Employees are encouraged to identify areas in which safety can be improved.
- Being a member of a joint labor/management safety committee.

1.5 Assignment of Responsibility

Organizational Structure

1.5.1 Team Managers

Team Managers are responsible for the following:

- Implementing LMSSC ESH policies and procedures.
- Providing full support and commitment for effective ESH programs.
- Establishing and communicating responsibilities for these programs.
- Assessing the effectiveness of the programs by regularly reviewing and evaluating results, reports, and each location's condition
- Initiating discussions regarding safety, fire protection, and employee health with reporting staff and upper management. (Such discussions should deal with program progress, specific needs, and any special projects or activities.) Including setting high standards for housekeeping and periodically conducting plant housekeeping inspections.
- Ensuring that all units conduct effective self-audit programs.
- Ensuring that all personal injury and non-injury mishaps are investigated, root causes of accidents are identified, and corrective actions are taken.
- Ensuring that programs are in place for proper safe job instruction of employees.
- Ensuring Line Managers know their ESH responsibilities and are trained to carry out their duties.

1.5.2 Line Managers and Project Managers

Supervisors and project managers are responsible for the following:

- Investigating mishaps, incidents, and close calls and completing the Accident Investigation Report.
- Providing job ESH inspection and guidance for all employees within the working group.
- Reviewing, updating, and implementing area ESH procedures.
- Providing a continuing training program for employees within the area of responsibility

- Maintaining a continuing surveillance and inspection program for potential SH hazards.
- Reviewing, approving, and distributing SH training materials.
- Initiating immediate administrative or physical controls and remedial action in cases where actual or potential hazards are identified.
- Recognizing and rewarding exemplary safety behaviors and administering coaching and counseling, where appropriate, when employees have not adhered to LMSSC and customer SH rules.

1.5.3 Lockheed Martin Corporate Environment, Safety and Health

Corporate Environment, Safety and Health (CESH) manage emerging Federal and State issues concerning environmental protection, safety, and health in concert with Lockheed Martin's policy. CESH maintains an intranet homepage that provides resources to all Lockheed Martin locations. LMSSC intends to fully utilize these resources, which include regulations, best practices, CESH policies and procedures, lessons learned, and others.

1.5.4 Lockheed Martin Team Environment, Safety and Health Manager

The LMSSC ESH program is administered by the LMSSC ESH Manager, who is responsible for the following:

- Developing and implementing LMSSC-specific policy and procedures
- Developing and implementing audit and assessment processes.
- Periodically measuring LMSSC ESH performance and improving the effectiveness of ESH programs/procedures as required.
- Developing and implementing LMSSC ESH training activities.
- Serving as the liaison with the customer and CESH.

1.5.5 Program Safety Officer (PSO)

The Lockheed Martin Program ESH Engineer acts as the Program Safety Officer (PSO) and will be responsible for the following:

- Implementing the LMSSC ESH program at the site (Including offsite and subcontractor facilities).
- Developing site-specific ESH operating procedures.
- Orienting site supervisors by communicating their specific ESH responsibilities and any special ESH requirements.
- Reviewing Site ESH inspection and meeting reports, and ensuring actions are taken to correct identified deficiencies.
- Reviewing and approving purchases of ESH-related supplies and equipment.
- Reviewing new or modified operations prior to implementation.
- Coordinating or conducting ESH training as required by applicable laws or policies.
- Managing and documenting ESH training, hazardous material communications, and hazardous operations training and certification programs.
- Maintaining good working relationships with all employees, management, engineering, and supervisory personnel.
- Developing and submitting ESH performance metrics, mishap reports, ESH trending data, and other ESH program deliverables to customers, NASA, LMSSC ESH department, and LMSSC managers.

Maintaining current knowledge of changes to ESH regulatory law and providing professional ESH Subject Matter Expert (SME) support to LMSSC leadership program managers, department managers, supervisors, project

The following individuals have been assigned responsibilities for managing the ESH program.

1.5.6 Company Medical Point of Contact

The Program Safety Officer is the point of contact to the NASA clinics to facilitate the communication of medical data.

The LMSSC Company's physician information is:

Name:

Address: 1111 Lockheed Martin Way, Sunnyvale, Ca. 94088

Phone:

1.5.7 Building Fire Warden

ESH designates Building Fire Wardens (BFWs) who are responsible for directing and controlling the implementation of evacuation procedures in the event of fire, bomb threat, dense smoke, toxic fumes, gas leak, or any condition that imposes a safety threat to personnel, systems, or the facility.

Once notified of a hazardous condition, the BFW assesses the severity of the emergency and identifies the location and source of the problem. When the situation warrants, the BFW notifies the Site emergency contact, and begins the orderly evacuation of personnel.

The PSO will be the point of contact with GSFC for communicating and coordinating the emergency planning and response for the program.

1.5.8 Building Emergency Manager

LMSSC buildings are staffed by locally designated Building Emergency Managers (BEM). The BEM is responsible for developing and implementing a Building Emergency Action and Recovery Plan (BEARP). Through implementation of the BEARP, the BEM ensures that all personnel safely evacuate from the area when required by an emergency.

1.5.9 Emergency Operations

LMSSC Emergency Operations provide any or all of the following:

- Company Emergency Management Planning coordinated with Public Agencies
- Disaster resistant Company Emergency Operations Centers
- Disaster resistant Network Communications HUB
- Disaster resistant Voice and Data Communications Systems for Emergency Control Organization Operating Units and Business Operations
- Facility Operations Damage Assessment and Emergency Response Teams
- Transportation and Procurement Emergency Response Teams
- Security and Emergency Services Response Team
- Safety and Environmental Protection Emergency Response Teams
- Media and Communications (PR) Emergency Response Team
- Employee Health Services Emergency Response Team
- Employee Emergency Preparedness Information

1.5.10 Environment, Safety and Health Communication

This section describes means of communication both onsite and offsite.

Employees are encouraged to inform management of any concerns or hazards associated with the workplace. Management is responsible for assuring that employees are provided with and have a safe and healthful workplace, recognize and understand workplace hazards. LMSSC uses at a minimum the following methods to promote workplace safety and health:

- Management Policies and Procedures
- Safety Committee meetings
- ESH Bulletins
- Safety Handbooks
- Safety and Health information found on each LMSSC company's website
- Videos/DVDs
- Safety Alerts
- Monthly Vice President ESH Performance Report
- Weekly Safety Messages

1.6 Provision of Authority

There are several aspects of the LMSSC ESH Program that ensures consistency with all applicable ESH requirements and regulations. First the LMSSC Environment, Safety & Health Standards and ESH Command Media are maintained current with applicable Federal, State, and local regulations under the responsibility of the ESH Manager. Secondly the GLM Program PSO has the responsibility of maintaining the GLM ESH program with the GLM contract.

Maintenance of both of these is accomplished similarly by periodic review, an updating as necessary, of all documents controlling work and products. These controlling documents are accessed through a web based controlling document master list, which is also maintained current by updating the list with document revisions as the documents are released.

The GLM ESH controlling document master list includes a reference to the LMSSC ESH controlling document master list; ensuring from GLM program standpoint documentation maintenance throughout the life of the contract.

1.7 Accountability

Management and employees are responsible for being informed on and accountable for implementation of safe practices and safety programs, which adhere to and are consistent with policy, as well as responsive to laws and requirements of regulatory agencies and customers. One way to ensure management/supervision will be held accountable is by having ESH evaluated as part of their performance appraisals. On the Management/Supervision Performance Appraisal it states that it is a corporate requirement that supervisors and managers be evaluated on the effectiveness in supporting the company's ESH practices. The evaluative comments are mandatory.

There are controlled procedures that are in place to ensure that management/supervisors review employee training needs analyses annually, which prescribe the employee required training and completion dates. Employee training plans are entered and kept up to date on Learning Management System (LMS). These controlled procedures are subject to periodic audits both internally and externally (AS9100) and as such will be written up with corrective and preventative actions

(CAPAs) if found non-compliant. CAPAs are formally tracked both from an implementation standpoint, as well as timeliness for closure.

LMSSC has procedures in place, which deal with employee conduct and discipline. Where, in the judgment of LMSSC, an employee's conduct or performance, including safety, is unacceptable, he or she may be given a reasonable opportunity to correct the deficiency. However, LMSSC, at its sole discretion, may forgo, eliminate, or accelerate any of these procedures; suspend an employee without pay pending further investigation; or demote or dismiss an employee immediately. Discipline is normally progressive, with initial being an oral warning confirmed in writing. Followed by 2) written criticism on an Employee Performance Notice (EPN, Form 4416); 3) Suspension without pay documented on an EPN and finally 4) Discharge an employee for cause.

LMSSC has a number of rewards to recognize employee contributions and as such, those activities associated with safe completion of hazardous activities are factored into the distribution of these rewards. These rewards include monetary awards through either productivity improvement plan awards or spot awards, as well as program management job well done letters. Spot awards are implemented as the name implies, on the spot.

1.8 Program Evaluation

The LMSSC ESH Management System (ESHMS) provides a methodical, uniform, and consistent approach to risk identification, assessment and management. LMSSC policy, this system, and LMSSC procedures complement site-specific practices. After assessing risks and understanding compliance requirements, business units develop a set of business objectives to set measurable targets. Roles and responsibilities are defined and training conducted to ensure competence. The business unit then self-assesses its performance and takes corrective actions, prompting the cycle to begin again. The ESHMS conforms to AISO 14001, CPS-015, and Functional Procedure (FP) ESH-01. The following elemental sections provide an overview of the ESHMS; refer to Figure 1 for a diagram of the LMSSC ESHMS.

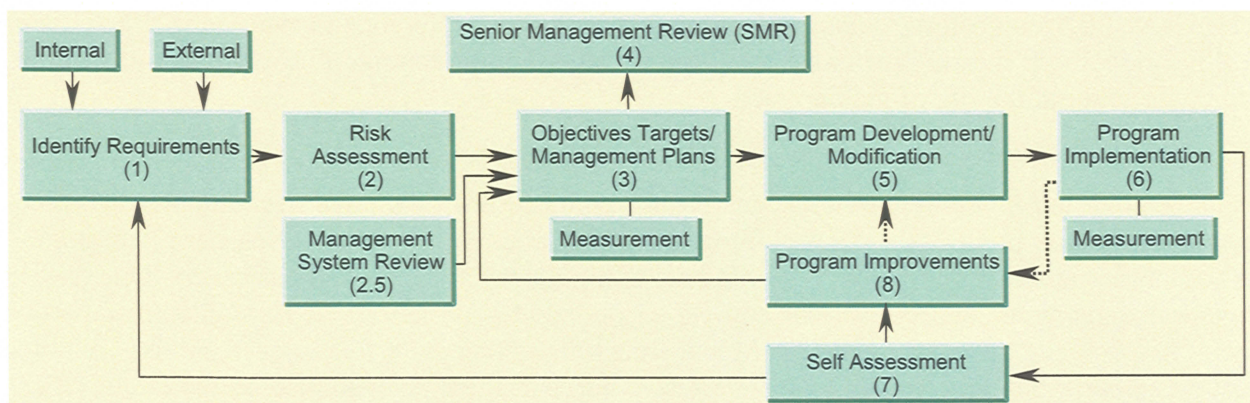


Figure 1 - ESH Management System Flow Diagram

This flow chart illustrates the management system core elements, order of implementation and relationship between the respective components. The intent of this chart is to provide a framework for LMSSC to implement site-specific programs in a consistent and uniform manner.

Element 1 – Identification and Review of Applicable ESH Elements and Requirements

The intent of this element is to provide a uniform and consistent approach to ensure it is current with applicable legal and other requirements.

- LMSSC ESH reviews information sources to identify new or modified regulatory, contractual, and other requirements to determine site applicability. When it is determined that existing systems are not adequate; the appropriate control(s) to ensure compliance or conformance with requirements will be developed.
- LMSSC ESH maintains Emergency Response Plans consistent with applicable regulatory requirements.

Element 2 – Risk Assessment Review

The intent of the risk assessment process is to identify, assess and manage risks to the public, personnel, the environment, or equipment in order to mitigate. The risk assessment contains the impact, controls and an assessment of whether existing implementations have adequately mitigated the hazard.

- The ESH Hazard Assessment and Management Toolbox or the simpler Risk Assessment
- Tool for Small Sites and International Locations version will be used to accomplish this requirement.

The Hazard Assessment and Management tool kit provides instructions and forms for quickly and simply identifying and characterizing ESH hazards and issues and developing general risk mitigation strategies. The intent is to determine which hazards are most significant and require management attention and to identify actions that can be taken to reduce the potential risk associated with the hazards. The methodology considers both traditional ESH impacts (e.g. potential for injury and illness, degradation of environmental quality) and business impacts associated with ESH hazards (e.g., regulatory agency scrutiny, customer relations).

Element 2.5 – Management System Review

The intent of the management system review is to assess the effectiveness of the management system implementation and identify opportunities for improvement. The review is to be conducted at least annually. Concurrent performance of the management system review and risk assessment is recommended.

Element 3.0 – Objectives, Targets and Management Plans

The intent of this Element is to describe how Objectives, Targets and Management Plans are used as tools to define the approach and resources, prioritize and correct a deficiency or enhance a process.

- Management plans assign responsibility, timeliness, and resources for achieving objectives and targets.
- Management plans are updated to account for new or modified activities, products or services.

Element 4.0 – Program Review

These reviews provide GLM community information necessary to carry out the integration of ESH considerations within the GLM plan. The review includes the assessment of the ESHMS performance, objectives, targets and progress on the continual improvement process.

Element 5.0 – Program Development/Implementation Process

This GLM Safety and Health plan describes the processes, which will be utilized for GLM development, implementation and maintaining currency with requirements.

Element 6.0 – Program Implementation

This GLM Safety and Health plan describes the methods used for GLM implementation, requirement currency, and maintenance and evaluation methods for performance, including personnel.

Element 7.0 – Self Assessment

This GLM Safety and Health plan describes the audits and assessments carried out through the life cycle of the GLM program.

Element 8.0 – Program Improvements

This element focuses on the enhancement of the entire management system, as opposed to just ESH performance. Performance evaluation provides a feedback loop with respect to required improvements.

Below, Figure 2 depicts how LMSSC's SH Plan implements the elements outlined in the PEP and used as performance criteria for a program evaluation. The six elements to be scored in the PEP are listed below with the corresponding LMSSC SH Plan section(s) listed in the opposite column.

Performance Evaluation Profile Element	SH Plan Section/Reference Document
1. Management Leadership and Employee Participation Visible Management Leadership Employee Participation Implementation Contractor Safety	1.1, 1.5.1-1.5.4 1.1, 1.4, 1.5.10, 2.1, 2.3 1.5.1, 1.5.2, 1.6, 1.7, 1.8 Supervisor Safety Manual
2. Workplace Analysis Survey and Hazard Analysis Inspection Reporting	2.0, 2.1 2.1, 2.2 1.3, 2.2, 2.3
3. Accident and Record Analysis Investigation of Accidents and Near Miss Incidents Data Analysis	3.1, 3.1.1, 3.1.2, 1.9, 3.2
4. Hazard Prevention and Control Hazard Control Maintenance Medical Program	4.1, 4.1.3 4.2, 4.3 1.5.7, 4.4
5. Emergency Response Emergency preparedness First Aid	5.0 4.4
6. Safety and Health Training	6.0

Figure 2 - PEP Implementation

1.9 Documentation of Performance

The following list includes but is not limited to statistics, reports, and checklists used by LMSSC to describe its approach to documenting its safety and health performance:

- Recordable Injury or Illness – All disabling work injuries and non-disabling injuries.
- Disabling Injury or Illness – A work injury or illness, which results in death, permanent total disability, permanent partial disability, or temporary total disability.
- Injury and Illness Incidence Rates – The rate established for recordable cases, lost workday cases and lost workdays.
- Accident/Incident Report – Filled out for every accident/injury and near miss.
- Hazardous Chemical Spill Reporting
- Quarterly Safety/Housekeeping inspection for Office Areas
- Monthly Safety/Housekeeping inspections for manufacturing, test, and laboratory areas.
- Weekly Hazmat/Hazwaste Inspections for Areas Storing Hazardous Materials or Waste

Of the documentation listed above, electronic access by the government will be available for:

- Recordable Injury or Illness
- Disabling Injury or Illness
- Injury and Illness Incidence Rates

For LMSSC activities conducted on NASA property all statistics, reports, and checklists generated will be made available. In addition to the three items listed above, LMSSC acknowledges the following as standing requests of the Government to be handled as described below for activities performed at NASA facilities.

- Roster of Terminated Employees at NASA facilities – All LMSSC employees that are terminated while at NASA facilities will be identified and reported to the Center occupational health program office. The report will be sent to the Occupational Health Officer no later

than 30 days after the end of each contract year or at the end of the contract, whichever is applicable.

- Information required:
 1. Date of report, contractor identity, and contract number.
 2. For each person listed, provide name, social security number, assigned Center badge number, and date of termination.
 3. Name, address, and telephone number of contractor representative to be contracted for questions or other information.
- Material Safety Data – For hazardous materials brought onto Government property or included in products delivered to the Government a Material Safety Data Sheet (MSDS), compliant with Federal Standard 313D (FED-STD-313D) “Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government Activities,” will be provided. A single copy of each MSDS will be sent upon receipt of the material for use on NASA property to the Center’s Central Repository, along with new or changed locations and/or quantities normally stored or used. The MSDS shall contain the following information in addition to all health and safety information pertinent to the product.
 1. The contract or solicitation number, manufacturer’s CAGE (Commercial and Government Entity) code, and contractors name and CAGE code.
 2. The national stock number, activity control number, or local stock number specified in the contract. If these are not present, enter the Federal Supply Schedule Special Item Number for the item.
 3. Where applicable, the specification reference including specification number, revision letter, type, grade, and class.
- Hazardous Material Inventory – LMSSC will compile an annual inventory report of all hazardous materials it has located on Government property and which is within the scope of 29 CFR 1910.1200, “Hazard Communication,” and FED-STD 313, “Material Safety Data, Transportation Data and Disposal Data for Hazardous Materials Furnished to Government ‘activities,’” as revised. This information shall provide the following:
 1. the identity of the material
 2. the location of the material by building and room
 3. the quantity of each material normally kept at each location

1.10 Government Access to Safety and Health Program Documentation

All GLM safety and health documentation for activities performed on government facilities shall be available for inspection or audit at the Government’s request.

1.11 Review and Modification of Safety Requirements

Upon NASA Contracting Officer’s Technical Representative request, LMSSC will participate in the review and modification of safety requirements that are to be implemented by the Government including any referenced documents therein.

1.12 Procurement

The Program Safety Officer’s responsibility includes, but is not limited to, providing safety engineering support for reviewing and updating safety requirements and criteria, safety requirements allocations to hardware and subsystems, specifically as it relates to procurement SOWs/DRDs and specifications, ICDs, and other program documentation. Thus flowing down

the appropriate responsibility to assure all required safety data is collected and provided for a thorough and complete integrated safety package.

All LMSSC requisitions for the procurement of chemical substances is reviewed by the ESH Department prior to purchase in accordance with the Toxic Substance Control Act (TSCA) and any other relevant EPA regulations (CFR 40). Chemical substances delivered to offsite facilities are accompanied by an MSDS compliant with FED-STD 313. LMSSC operations that store, issue, or use hazardous materials in customer facilities complies, at a minimum, with NASA related storage, issuance, or use of hazardous materials. LMSSC operations that store, issue or use hazardous materials in LMSSC facilities comply with local and/or Federal requirements, Lockheed Martin CESH CPS-015 and FP-ESH-01, and local ESH Department standards and procedures.

The ESH Site Safety Representative will review and approve any requests for procurement of chemicals or hazardous substances. The ESH engineer determines the need and researches the availability of less potentially hazardous or more environmentally acceptable substitutes prior to approval.

2.0 WORKPLACE ANALYSIS

The ESHMS, as identified in Section 1.8, provides a methodical, uniform, and consistent approach to risk identification, assessment and management. Identifying and evaluating hazards in a workplace ensure that hazards are identified and corrected in a timely manner. LMSSC addresses this concern by utilizing the Injury and Illness Prevention Program (IIPP) and the Job Hazard Analysis (JHA). Please refer to "Injury Illness Protection Program" 1.3.3-T1-ESH-35.0-S.

- IIPP

This describes what is to be done, and how it is to be accomplished, by specific reference to applicable company standards, policies, and procedures. In addition, it is intended to enhance employee awareness of workplace hazards and the requirement to maintain a safe place of employment. Its elements include:

1. Identification of individual(s) responsible for implementing the program.
2. Methods to ensure employee compliance with safe and healthful work practices.
3. System(s) for communicating Safety and Health information.
4. System(s) for identifying and controlling hazards.
5. Procedures for investigating occupational injuries and illnesses.
6. Methods and procedures for correcting unsafe or unhealthy work conditions.
7. Supervision and employee Safety Training.
8. General Occupational Safety and Health Committee.

- JHA

This is a tool used by the line manager/supervisor to identify hazards and specify controls. This hazard evaluation is to be performed for each operation, and must be updated every time the operation is modified. When possible, the hazards will be eliminated or minimized using engineering, administrative, or PPE controls.

There are several methods by which this data is compiled. All occupational injuries and illness must be reported immediately to Emergency Services Dispatcher, in Sunnyvale extension **911**, or supervision, depending on the severity of the injuries and illness. 1.3.3-T1-ESH-73.0-S "Standard Injury Illness Reporting" is followed for accidents, occupational injuries and illness (including chemical spills) and requires that the Occupational Safety & Health organization receive, potentially further investigate, maintain and compile the appropriate statistical data associated with the accident.

Managers and supervisors are required to perform monthly/quarterly inspections in order to maintain a safe workplace in their areas of responsibility per 1.3.3-T1-ESH-18.0-S, "Monthly/Quarterly Self Inspection". They also have the responsibility to correct or identify additional resources required to correct any deficiencies identified during the audit. Records are required to be retained in organizational files for a minimum of 1 year.

The above safety products generated for GLM activities at government facilities will be made available for review and concurrence upon request through the PSO.

2.1 Hazard Identification

Procedures for identifying and evaluating hazards are as follows:

- Quarterly Safety/Housekeeping Inspection for Office Areas
- A checklist used by management to inspect their areas for hazardous conditions or methods, and to record any corrective actions taken. Self-inspection forms are maintained for at least a year.
- Monthly Safety/Housekeeping Inspections for Manufacturing, Test, and Laboratory Areas
- A checklist used to record the inspection results and document the corrective actions taken.
- Self-inspection forms are maintained for at least a year.
- Weekly Inspections for Storing Hazmat/Hazwaste.
- ESH Compliance Reviews
- These reviews are designed to evaluate the effectiveness of the organization's injury and illness program as well as other facets of the ESH program.
- Review of plans and procedures
- Proposed modifications to facilities and major equipment are reviewed for ESH implications prior to approval by management.
- Requirements to ensure employees are provided with the proper equipment to minimize injury or illness from the hazards associated with their tasks.
- Review of new or modified equipment, processes, procedures, and substances are evaluated for safety prior to implementation.

The System Safety group also performs Hazard Identification. The following describes System Safety's role with respect to Hazard Identification.

A System Safety Engineer (SSE) is a knowledgeable safety engineer assigned responsibility and accountability for system safety design, development, documentation, verification, test, operation, and mission success of the GLM and GLM Ground Support Equipment (GSE). The SSE ensures compliance to safety requirements imposed and derived necessary for a successful mission. Safety assessment is the SSE's top priority to support 100% mission success. The SSE is held responsible for the safety of the hardware, the quality of the safety assessment and reviews the readiness, performance and pedigree of the product.

- Be the "focal-point" for the resolution of any safety issue.
- Appeal any decision that in their judgment may adversely affect safety. Note: In no case will the appeal of an issue, judged to be safety-critical by a SSE, be dismissed or categorized as inappropriate behavior by LMSSC.

The role of the SSE includes the following functions and responsibilities:

- Support development of, understand, and approve all imposed or derived safety requirements, including interfaces and verification requirements. Ensure product compatibility across interfacing product(s). Understand the installation of the hardware into the next higher assembly and system-level activities involving the hardware.
- Develop safety requirements verification plan. Assure plans and procedures for test, analyses, demonstrations, inspections, and manufacturing incorporate the appropriate safety verification.
- Remain knowledgeable of system safety requirements document.

- Develop an intense technical understanding of safety requirements and controls. Be knowledgeable of any deviations. Only accept deviations that conclusively show no adverse effect on safety. Maintain in-depth knowledge of the safety assessment over its life cycle, and investigate / resolve any concerns.
- For Commercial Off the Shelf (COTS) products lacking the traditional historical pedigree, bring to management's attention any use of COTS that the SSE deems to be unacceptable risk.
- Ensure verification methods (Test, Analysis, Demonstration, Inspection) are decisive, and adequate to characterize safety performance and support Mission Success. Elevate hardware safety concerns, which cannot be resolved through normal channels, to the program manager.

The Systems Safety Engineer has the responsibility to prepare the hazard analyses and document anything identified as non-compliant for review and approval.

The tasks associated with representing the LMSSC as a Systems Safety Engineer include, but are not limited to:

- Emphasis on safety in design concepts and throughout development and production by adequate analysis, testing, quality assurance, and product support. Verification by testing, analysis, or other methods that components, subsystems, and end products meet safety objectives established for the program and product.
- Evaluation of product designs, using design standards, design reviews, historical data, and experience on comparable products to ensure the early identification and reduction or elimination of potential hazards. Evaluation of new materials and new production techniques, by analysis and test, to ensure system and product safety.

2.2 Inspections

Line management conducts manufacturing facility inspections monthly and desk/board facility inspections quarterly with the assistance of ESH personnel. Area supervisors are responsible for correcting the identified hazards. Environmental and safety engineers assess discrepancy reports for severity, probability, and adequacy of the corrective actions. The line manager ensures that corrective actions are tracked to closure and that they are effective.

ESH professionals are responsible for verifying corrective action implementation and closure from the monthly management inspections. They are also responsible for conducting audits to ensure compliance to contract requirements. Discrepancies are reported to LMSSC ESH Office with status of corrective action implementation until closed. For additional information, please refer to Section 2 Workplace Analysis, and Section 2.1 Hazard Identification.

2.3 Employee Reports of Hazards

Personnel whose safety could be affected by their work have the freedom and authority to:

- Identify and record any problems relating to the product, process, or Quality System
- Suspend operations, recommend, or provide solutions
- Verify the implementation of solutions
- Control further processing, delivery, or installation of nonconforming products until the deficiency or unsatisfactory condition has been dispositioned.

- Employees are encouraged to identify areas in which safety can be improved. Management quarterly reviews provide a forum for improving safety. Two methods employees have for notifying management of unsafe work conditions/environments are:
- Safety Attention Notices - A form (LMSSC Form 1989-4) used by employees to document/communicate safety and health concerns.
- Safety Service Request – Is submitted to the facilities organization to provide repairs to faulty equipment or make facility modifications to eliminate an identified workplace hazard.
- Facility Modification Request – to correct safety hazards. ESH approval is required for ESH related items.

3.0 MISHAP INVESTIGATION AND RECORD ANALYSIS

3.1 Mishap Investigation

At LMSSC facilities or offsite facilities, as soon as practical the involved employee notifies his or her supervisor, facility manager and/or the Site Safety Representative with an immediate report describing the where, what, and when aspects of the occurrence. This includes accidents, fires, hazardous chemical spills, and any other ESH-related emergencies. The facility manager will notify the proper site safety representatives and the LMSSC Site Safety Representative will notify the GSFC Safety Office via a Flash Report (within 24 hours) for information purposes. Mishaps and Close Calls with potential for Type C injuries or damages and above will be reported within 10 days and are reviewed with the GSFC Safety Office monthly. They may be separate or presented monthly at the Program Management Review. Type C injuries or damages may cause disability to one or more persons due to an occupational injury or illness resulting in a lost workday or restricted duty case. A type C injury or damage is also defined as more than three no lost-time occupational injuries or illnesses, and loss or damage to equipment or facility from \$25,000 up to and including \$250,000.

For mishaps, which includes accidents, fires, hazardous chemical spills, and other ESH- related emergencies, which take place offsite, the following happens (at LMSSC):

- For mishaps which require immediate attention (chemical spills, fires, explosions etc.)
- Any observer or person involved should dial 911 to reach the Emergency Services Dispatcher.
- The Dispatcher will notify the local emergency units (Fire, Police, Medical) and manager of Emergency Operations to respond as deemed appropriate to cope with the emergency
- For mishaps which are not imminent and/or serious
- Any observer or employee should take appropriate action to control or reduce the hazard,
- and prevent others from endangering themselves, without exposing oneself to injury.
- If the hazard can be corrected via a Safety Service Request phone Facility Operations to initiate a request. Report the hazardous condition to the cognizant manager/supervisor and submit a Safety Attention Notice.
- Facility Operations will review the request and request technical guidance from ESH personnel.
- A program safety representative and ESH, as requested, will respond to provide technical advice and other assistance necessary to correct the problem.
- Managers/Supervisors determine the nature of the hazard/mishap and take actions as follows: if necessary temporarily shut down equipment or block off the area, initiate action to eliminate or control any hazardous conditions or processes identified; and assure corrective action(s) is (are) implemented.
- See also EMP 1.3.3-T1-ESH-1.0-P "Environment, Safety, and Health Management Systems."

3.1.1 Prevention of Recurrence of Mishaps

The Site (Offsite or at other than LMSSC facilities) ESH Department is the central location/depository for all reports and records pertaining to mishaps, close calls, corrective actions, and lessons learned arising from occurrences in areas where LMSSC members are located.

LMSSC ESH Department will be the central location/depository for all reports and records pertaining to mishaps, close calls, corrective actions, and lessons learned arising from occurrences in areas where LMSSC members are working on GLM contract activities. (See LM EMP No: 2.71-2, Rev.3, "Identification, Reporting and Correction of Occupational Hazards). The ESH organization publishes a quarterly bulletin, which captures lessons learned from the quarter and is made available to all employees. Also, after mishap investigations are completed a review of the controlling document is performed with updates from lessons learned. LMSII (Lockheed Martin Standard Injury & Illness) is the system used to track safety performance and accident history at LMSSC. The past safety performance for LMSSC is presented in Figure 3 below.

	2006 YTD	2007 YTD	vs 06 YTD	vs 07 Goal
Day Away Cases	125	119	↓5%	
Day Away Case Rate	0.24	0.22	↓8%	↓27%
Days Away	2194	2124	↓3%	
Severity Rate	4.19	3.97	↓5%	↓60%
Recordable Cases	1023	748	↓27%	
Recordable Rate	1.95	1.40	↓28%	↓33%
Incidents	2411	1874	↓22%	
Incident Rate	4.60	3.50	↓24%	
Avg Employees	135344	134976	↓0%	
Performance As Of: 05/17/2007 11:30 Eastern Time				

Figure 3 - LMSSC Past Safety Performance

3.1.2 Close Calls/Near Misses

A Close Call Report is completed and distributed to the appropriate NASA offices for onsite issues. The building Facility Manager, LMSSC Site Safety Representative, and Program Safety Officer are concurrently notified of the close call and submission of the report. The corrective action is outlined, and those items not fixed immediately are tracked to closure. Close Call/Near Miss reporting is also completed for offsite incidences. The report is forwarded to the Program Safety Officer for record keeping and follow-up.

Each close call/near miss (onsite or offsite) is investigated by the first-line supervisor, who is responsible for consulting with the close call originator, recruiting the necessary disciplines, coordinating with safety engineering, and identifying the root cause of the close call. Normally, corrective action for the close call is included in the report.

3.2 Trend Analysis

LMSSC ESH departments compile statistics and reports, and perform analyses for trends on a monthly basis. The Fishbone Analysis tool, see Figure 4, gives an example of how injury and illness causes are evaluated for root cause and corrective action. This information is provided to management for review and to status the health of the ESH process. Upon request, LMSSC will provide the following metrics to NASA at the monthly Program Management Review.

- OSHA Recordable Frequency Rates
- OSHA Lost Workday Case Rate
- OSHA Lost Workday Case Severity Rate

Per NPG 8715.3A, Appendix E, LMSSC will provide the following:

- Accident/Incident Summary Report – for all new and open mishaps, including vehicle accidents, incidents, injuries, fires, and any close calls will be described in summary form along with current status. A report will be generated by the 10th day of the month following each month reported and delivered to the GSFC Safety Office.
- Log of Occupational Injuries and Illnesses – Each LMSSC member ESH department will provide a copy of its annual summary of occupational injuries and illnesses to the Site ESH Manager who will deliver them to the Government within 45 days after the end of the year to be reported.

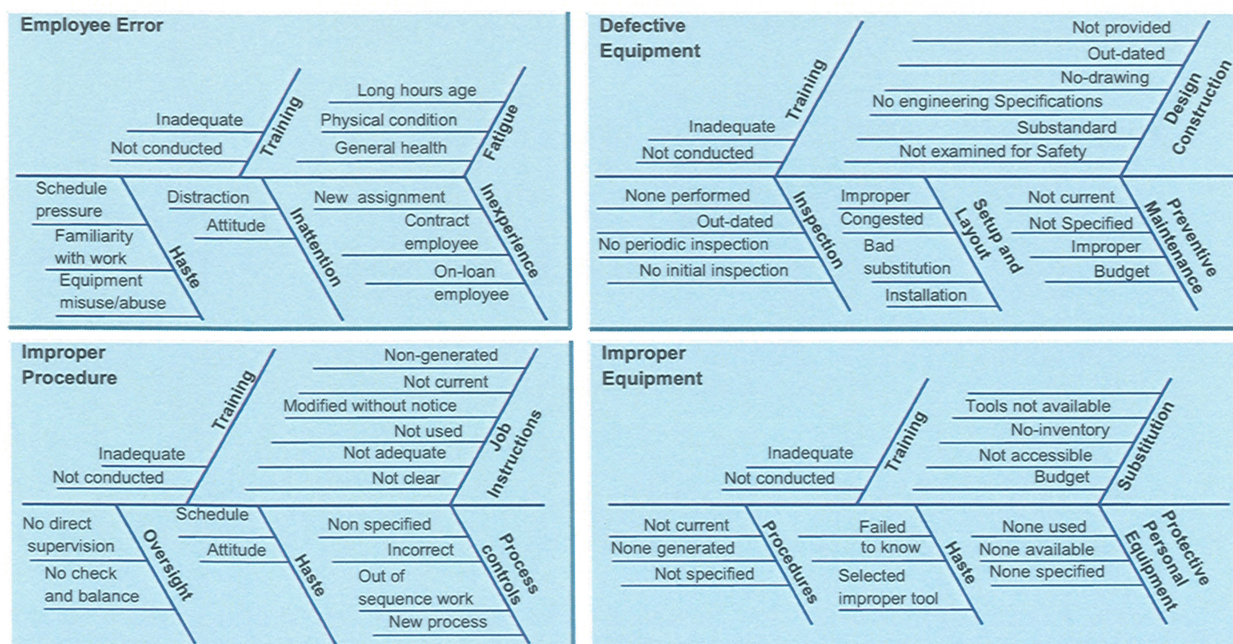


Figure 4 - Fishbone Analysis

4.0 HAZARD PREVENTION AND CONTROL

LMSSC managers work with other support contract and NASA managers to promote a safe and healthful work environment in onsite and offsite facilities. This includes communicating information concerning ESH policies/procedures, best practices, lessons learned, hazards and their discrepancies and corrective actions among the different companies. LMSSC will use the GLM Web Portal to accomplish this task. The web portal will provide NASA and GLM subcontractors access to important documentation and communication items. By using the GLM Web Portal, NASA will be able to collect risk management information and transfer it to their information data system.

4.1 Appropriate Controls

The ESH Job Hazard Analysis Worksheet (JHAW) tools help line managers and supervisors identify hazards and specify controls. Each task and operation performed in an area will be evaluated. Each hazardous task will be assigned hazards and controls. The information on the worksheets will be used to prepare a Job Hazard Analysis (JHA) for the work area.

The hazard reduction precedence sequence used by LMSSC is based on the severity of the hazard. An imminent hazard requires immediate abatement and if necessary evacuation of employees until the hazard is mitigated. A non-imminent hazard can be addressed using a Safety Service Request and/or a Safety Attention Notice.

If a residual risk is identified during a hazard analysis then the finding is communicated with all employees that are at risk. In addition, management will apply an administrative control to warn employees of potential hazards.

There are three common types of control that can be implemented to mitigate a hazard. They are listed in the sequence of preferred implementation. A fourth type of control, not often considered, is listed last.

- Engineering – a mechanical device that isolates physical contact between a person and a hazard.
- Administrative – regulations, policies, procedures, standards, safety rules, warning signs, barriers, etc. that are designed to warn employees of potential hazards.
- Personal Protective Equipment (PPE) – protective devices designed to reduce or eliminate hazardous (chemical, physical, or radiological) conditions.
- Behavior – actions performed by employees in the workplace that contribute to the safety or hazards of a particular operation/task

The JHA scope of coverage includes at a minimum the following:

- Hazardous chemicals
- Equipment
- Discharges
- Waste
- Energies

JHAs to be performed for GLM operations, onsite and offsite, will be coordinated with the appropriate NASA representative (safety, health, environmental services, and emergency authorities). If requested, NASA will take part in the analysis or results will be made available on the GLM web portal.

The System Safety group also performs Hazard Identification. The Systems Safety Engineer performs hazard analyses with emphasis on safety in design throughout integration and launch, including interfaces with support equipment and facilities. As hazards are identified they are also addressed with controls to mitigate the hazard.

The Hazard Analysis scope of coverage includes at a minimum the following: Electrical; Environmental Control; Human Factors; Materials; Mechanical; Optical; Pressure Systems; Radiation; and Structures.

The following order of precedence is followed for the resolution of identified hazards:

- Hazard Elimination: Hazard sources or hazardous operations are eliminated
- Design for Minimum Hazard: Design has ensured inherent safety through appropriate design features, materials and parts selection, and safety factors. Damage control, containment, and isolation of potential hazards have been implemented.
- Safety Devices: Known hazards, which could not be eliminated by design, are reduced to an acceptable level by use of appropriate safety devices as part of the system, subsystem, or equipment.
- Warning Devices: Where it is not possible to preclude the existence or occurrence of a known hazard, warning devices are employed for the timely detection of hazardous conditions and the generation of adequate warning signals.
- Special Procedures: Where it is not possible to reduce the magnitude of an existing or potential hazard by design or by use of safety and warning devices, special procedures are developed to counter hazardous conditions for personnel and the protection of products.

4.1.1 Hazardous Operations

All hazardous operations are evaluated, at a minimum, for the following basic requirements: hazardous operation categorization, verification of training and certification, development of procedures, and use of permits. Any new or non-routine hazardous operations are evaluated and handled appropriately when the potential for death, serious injury, or loss of critical high-dollar-value hardware has been determined.

Through the program planning stages, i.e. PDR and CDR, the PSO will identify those operations that are hazardous and compile in a list. This list will then be time phased with the integrated schedule, such that test procedures/operation orders are generated before the start of hazardous operations. The test procedure/operation order will identify the specific hazardous operation, along with the appropriate controls/steps to mitigate the hazard. The PSO has the responsibility to review procedures, which may identify additional hazardous operations. This review allows the PSO to maintain/update the list of hazardous operations for GLM. As identified earlier it is also the ESH engineer's responsibility to flow these requirements down to the subcontractors to ensure a "total" list.

Product Assurance (PA) ensures requirement adherence that all affected personnel are notified through procedural call-outs.

4.1.2 Hazardous Operations Procedures

In addition to what was identified in 4.1.1 supervisors and ESH ensure that permits required for hazardous operations are approved before any work is attempted. Before a hazardous operation procedure is written, a JHA is performed to identify any hazardous situation and the proper controls for that procedure. Permits are good only for a limited time, such as one shift, and expire on

the date and time shown on the permit. The permit must be posted at the job site along with any procedures being used until the job is completed.

Supervisors ensure that work-authorizing documents such as the Test Preparation Sheet (TPS), Discrepancy Report (IDR), and Engineering Change Order (ECO) accompany all permits. A documentation-controlled system is used to store all completed permits in addition to the distribution referenced on the permit.

4.1.3 Protective Equipment

PPE is used only when engineering and administrative controls in themselves are insufficient in protecting the employee from operational or chemical hazards. LMSSC members are trained and required to wear protective equipment as necessary to protect them from the hazards of their work environment. Hazard assessments are performed to determine the specific protective equipment necessary for the work environment, in accordance with local ESH Operating Procedures. PPE assessments are certified as meeting appropriate OSHA requirements. Precautionary steps to safeguard the employees are included in the operating procedures/instructions. Each employee is trained on the proper selection, inspection, and maintenance of the protective equipment selected for his or her area. Training can be accomplished via classroom or computer-based training with an objective of ensuring that the transfer of learning took place. Any documentation concerning the above is kept by the cognizant supervisor or by the Site ESH Manager.

4.1.4 Hazardous Operations Permits

Lockheed Martin Team members perform self-assessment/program evaluations for hazardous operations as defined by company ESH policy, Site customer's hazardous operation definitions, or OSHA regulation. Training and certifications required for these operations comply with Section 6, SH Training. Hazardous operations, identified at this time, will require hazardous operation permits for the following activities; contamination control, the use of cranes, and the use of Mechanical and Electrical Ground Support Equipment.

4.1.4.1 Training and Certification

Personnel who are assigned hazardous tasks are trained and certified to safeguard themselves, their coworkers, and Government property. Managers assign work only after the employee is trained and certified. Supervisors, having determined that a particular task is hazardous, establish certification criteria for workers who may be assigned to that task. The criteria may include formal classroom training, On the Job Training (OJT), a physical exam, and respirator use and fit check. Certifications submitted by the supervisors must receive approval from the Site ESH Manager and the Site Manager. ESH Department or management retains approved certifications. Some operations require licensing and proof will be requested prior to the commencement of the operation.

When an employee has satisfied all of the criteria required for a particular certification, the employee is certified and credited. If a person's training or certification is about to expire, the manager contacts the ESH Department to schedule refresher training or physical exams for that employee.

4.1.4.2 Operations Involving Potential Asbestos Exposures

LMSSC employees who perform Class III asbestos operations (incidental contact) receive a Class III asbestos worker certification consisting of the following:

Formal classroom training on Class III asbestos operations and maintenance

- Training on the use and care of PPE
- A respirator user's physical exam
- A respirator use and fit test

Moreover, an employee who has been certified as a competent person in Class III asbestos operations supervises these workers. This complies with asbestos programs and requirements specified in the Center's Asbestos Control Manual. When job performance requires placing employees in a more hazardous environment, the customer requirements are reviewed; and training and certifications are assessed. If deemed necessary by the ESH Department, additional training for employees is provided.

There is no anticipation that there will be any incidental contact with asbestos on the GLM program.

4.1.4.3 Operations Involving Toxic Materials or Health Hazards

An MSDS hazardous constituent-level chemical substance review is completed for all Lockheed Martin-operated facilities onsite. Any area determined to have chemicals or physical agents that are potentially toxic or hazardous to health have a hazardous analysis performed to determine the risks related to the materials. Operations that have the potential for exposure to employees at or greater than the Permissible Exposure Limit (PEL) have an area survey conducted or monitored for initial assessments and procedures implemented to control the hazard. If the assessment's results warrant, employees performing those operations are enrolled in the medical surveillance program.

4.1.4.4 Operations Involving Hazardous Waste

LMSSC employees control the hazardous waste at the point of generation. They set up areas separate from other chemical storage, set up a segregation plan for the wastes to prevent unintentionally mixing wastes, and complete the proper paperwork necessary for waste removal. The customer's Environmental Service Offices is notified of any LMSSC new or modified hazardous waste operation onto the NASA Site in the planning stage.

4.1.4.5 Operations Involving New or Modified Emissions/Discharges to the Environment

The cognizant task manager notifies ESH whenever a new or modified process is in its planning stages, so that an environmental review can be performed to determine any environmental regulatory compliance issues or environmental emissions/discharges of the process.

If the process change or new process is on a customer site, ESH notifies the customer's Environmental Services Office. LMSSC will provide sufficient lead-time for the processing of permits through the applicable State and Federal natural resources conservation commissions as appropriate.

4.1.4.6 Pollution Prevention

Pollution prevention and resource conservation include chemical elimination, substitution, reuse, and/or recycling; energy conservation; water conservation; solid-waste reduction, reuse, and recycling; and purchase of materials with recycled content. The LM Pollution Prevention Plan addresses the following elements:

- An annual assessment to identify targets and priorities as part of the annual ESH

- Self-assessment process
- Annual pollution prevention goals and measurement against the goals
- A system for identifying and controlling the purchase and use of chemicals, minimizing amounts procured; and controlling packaging and shelf life to minimize waste
- A mechanism for identifying, recording, and tracking the status of pollution prevention and conservation project benefits and costs
- Flow down of principles and goals to the operational elements
- Participation in corporate and industry best practices and technology transfer
- Elimination of Class I ozone-depleting chemicals associated with manufacturing processes, facility air conditioning, refrigeration equipment, and fire-suppression systems.
- Environmental Reduction Metrics.

4.2 Maintaining Baseline Documentation

Responsibilities for maintaining facilities baseline documentation will be outlined in the Facility Plan for the facility where the work will be performed. LMSSC will implement any facilities baseline documentation tasks (including safety engineering) as provided in the LMSSC ESH Plan approved by NASA or as required by contractual or technical direction.

4.3 Preventative Maintenance

Preventative maintenance is scheduled through a computer generated database that tracks equipment maintenance due dates. When facility equipment is due for maintenance it is highlighted and scheduled for a period of at least impact to ongoing programs. In the event an anomaly is found during the maintenance a discrepancy report is written, and evaluations begin to determine options for use, repair, or replacement. The customer is notified if the anomaly increases risks to customer hardware or schedule. If the anomaly renders the equipment unsafe it is tagged out.

4.4 Medical Program

LMSSC provides a medical examination program to assure that employees working with toxic substances or harmful physical agents are not adversely affected by exposure, and that periodic examinations are made available to employees with the frequency and type of examination defined by the nature of the exposure. LMSSC provides medical surveillance for the following:

Any chemical substance, biological agent (bacteria, virus, fungus, etc.), or physical stress (noise, heat, cold, vibration, repetitive motion, ionizing and non-ionizing radiation, hypo or hyperbaric pressure, etc.), which is:

- Regulated by any federal /state law or rule
- Listed in the latest printed edition of the National Institute for Occupational Safety & Health registry of toxic effects of chemical substances as yielding positive evidence of acute or chronic health hazards in human, animal, or other biological testing
- Listed on a MSDS which indicates that the material may pose a hazard to human health

The following medical records are maintained:

- Medical questionnaires or histories
- Medical complaints, diagnosis, and recommendations
- Biological monitoring results
- Medical records analyses conducted by each LMSSC member company

LMSSC medical services provided on campus are:

- Medical exams and testing for employees involved in OSHA and DOT regulated activities
- Treatment of occupational injuries and illness'
- Ergonomic programs and evaluations
- Medical support for foreign launch activities
- Advise employees on medical issues

Cardiopulmonary Resuscitation (CPR) and First Aid training are available for LMSSC employees through the Wellness Program.

- LMSSC has emergency teams available 24 hours a day (i.e. ERT, Medical (including CPR) Fire Protection, Security, Hazard Control, and Operations Services.). For personnel assigned to, or visiting, LMSSC buildings the following instructions are provided:
- Dial "911" to report the emergency
- Give the dispatcher the type of emergency (i.e. medical, fire etc.), the location (i.e. building number/name, floor, column number), and answer any questions the dispatcher asks
- Notify supervision, Emergency Floor Coordinator, or Building Emergency Manager as appropriate for the emergency.

5.0 EMERGENCY RESPONSE

LMSSC identifies and takes preparatory actions to assure an organized response in the event of induced or natural emergency or disaster events. Actions focus on minimizing the exposure of public/personnel and assets to unwarranted risk, injury or damage, while maximizing recovery of operational capability.

Various regulations (e.g., community right-to-know, air and water pollution, hazardous waste, OSHA, hazardous materials, storage laws, and fire and building codes) require that LMSSC have emergency plans. LMSSC has administrative requirements and procedures for control of emergencies and conducts regularly scheduled drills for building emergencies. LMSSC members follow the host site emergency plans when located onsite.

Managers and supervisors, in order to be ready for contingencies, must know their operations and what kind of events might cause them to be a threat to employees, the community, and the environment. Managers and supervisors must:

- Be familiar with contingency planning applicable to their operations and understand their roles in emergencies.
- Ensure that employees receive necessary training in emergency response and know what to do in an emergency
- Ensure that fire hazards are eliminated or controlled.
- Ensure that chemical spills are reported and recorded.
- Provide for the needs of disabled employees in the event of an emergency.

Every occupied building at LMSSC has a Building Emergency Manager (BEM) who is responsible for developing and implementing a Building Emergency Action and Recovery Plan (BEARP). Supervisors need to know who the BEM for their building is. They need to have a copy of the current BEARP and must orient employees on emergency procedures when they are first assigned to the building and whenever the plan is changed or updated.

BEMs should be contacted first to obtain information about the LMSSC Emergency Control Plan. ESH staff and Industrial Engineers may have to be consulted to obtain further information on contingency planning. There are contingency plans associated with almost all permitted operations. Managers and supervisors are responsible for the implementation of all contingency plans applicable to their areas of control. Additional information about the LMSSC Emergency Control Plan is available from the Emergency Operations Office.

Supervision must inform all employees, prior to their first assignment, of emergency procedures and means of egress as they apply to specific work areas. Subjects that must be covered should include:

- LMSSC emergency response phone number
- Alarm systems used
- Emergency shutdown operation procedures
- Routes of Evacuation
- Location of assembly point after evacuation

In addition, provision must be made for any physically impaired employees to ensure that their needs are met during an emergency.

LMSSC members on Emergency Response Teams (ERT) have received specialized training in any one, or all of the following fields including, first aid, automatic electronic defibrillator, and comply with 29 CFR 1910.120 (HAZWOPER) by receiving annual re-certification courses. In addition to annual re-certification training, the ERT members hold quarterly emergency response drills and are evaluated for emergency preparedness.

In the event of an emergency, ERT members will provide technical support to local emergency services (Fire, Medical, Police etc.).

All occupational injuries and illness must be reported immediately to Emergency Services Dispatcher, in Sunnyvale extension 911, or supervision, depending on the severity of the injuries and illness. Any observer or person involved should dial 911 to reach the Dispatcher. The Dispatcher will notify the local emergency units (Fire, Police, and Medical) and manager of Emergency Operations to respond, as deemed appropriate, to cope with the emergency.

Besides holding regular drills, another way to verify emergency readiness is through the use of the ESHMS, see Section 1.8. Emergency preparedness and response procedures shall be maintained to identify potential response to accidents and emergencies, and for preventing and mitigating associated impacts. Procedures shall be reviewed and revised through periodic reviews and particularly after occurrence of accidents or emergencies. Procedures shall be periodically tested where practicable.

LMSSC Emergency Operations provide any or all of the following:

- Company Emergency Management Planning coordinated with Public Agencies
- Disaster resistant Company Emergency Operations Centers
- Disaster resistant Network Communications HUB
- Disaster resistant Voice and Data Communications Systems for Emergency Control Organization Operating Units and Business Operations
- Facility Operations Damage Assessment and Emergency Response Teams
- Transportation and Procurement Emergency Response Teams
- Security and Emergency Services Response Team
- Safety and Environmental Protection Emergency Response Teams
- Media and Communications (PR) Emergency Response Team
- Employee Health Services Emergency Response Team
- Employee Emergency Preparedness Information
- Business Continuity Planning

6.0 SAFETY AND HEALTH TRAINING

The goal of the training program is to ensure that qualified personnel are available to perform their assigned tasks and to operate facilities in a safe and reliable manner. Training focuses on understanding and applying safe work procedures to the task, recognizing and dealing with any associated hazards, and being familiar with the appropriate PPE and/or countermeasures to safely and effectively deal with hazards encountered on the job. An ESH training matrix that is derived from regulatory requirements and from training needs identified through Job Hazard Analyses (JHA) is used to assist managers/supervisors in determining an employee's ESH training needs. Where certification is required, employees are trained and certified in accordance with the regulatory agency requirements prior to performing the task including successful mastery of the subject matter. The managers/supervisors or the ESH Department, depending on the hazard criticality, maintains training and certification records. A comprehensive training and certification course listing can be found in OSH 1.5 "Safety Training", including time requirements for renewal. Refresher time requirements factor in the retention of skills when set, to ensure personnel will be able to respond appropriately if an emergency should arise.

Existing training resources available through LMSSC, NASA and the contractor community are fully utilized to the extent possible to ensure consistency of messages, understanding of the overall ESH picture, and minimizing contract costs. LMSSC also offers safety-training videos that are available for use by our subcontractors.

LMSSC provides employees with Personal Protective Equipment (PPE) as needed to safely accomplish assigned duties. When engineering and administrative controls cannot reduce the hazards of exposure to acceptable levels, PPE for the eyes, face, head, feet, and lungs will be provided and used. Managers establish and maintain an effective PPE Program; and managers and supervisors enforce safety rules. Complete and consistent compliance is mandatory to establish a "non-negotiable" safety culture. Failure to wear PPE and to observe other safety requirements is to be treated with verbal warnings, then written warnings, then suspension without pay, etc. All PPE shall be of safe design and construction for the work performed. The following are PPE duties and responsibilities:

Management

- Conduct workplace hazard assessment
- Select PPE appropriate to the hazard identified during the assessment
- Provide PPE to workers
- Define training requirements for employees
- Conduct training as applicable
- Maintain certifications of hazard assessment and training
- Must provide, to employees required to use PPE, training that includes; how to properly wear PPE, when PPE must be used, describing how PPE provides protection against the hazards identified in the assessment, the proper care and useful life of PPE, and the proper disposal of damaged PPE.

Supervision

- Define training requirements for employees
- Conduct training as applicable
- Ensure employees understand training on PPE

- Ensure employees use PPE when needed
- Maintain certifications and training records

ESH

- Provide assistance in conducting a workplace hazard assessment
- Provide assistance in PPE selection
- Provide assistance in developing worker training
- Conduct training as applicable
- Conduct periodic audits of PPE program

The tailoring of training towards specific audiences and topics are as follows:

Management

- Managers, who have first-line supervisory personnel reporting to them, are recommended to take the same required courses, as those required for their supervisory personnel.

Supervisors

- One of supervision's most important responsibilities is to ensure that affected employees receive the training needed to perform their duties safely and correctly. Supervisors have the knowledge of their area operations and processes, which they can use to inform their employees of proper operations and what potential hazards may exist in the work area. To meet these training requirements, supervision must:
- Ensure that newly hired or transferred employees receive the required safety orientation for the work area
- Ensure that all employees receive the required training for their various job duties. Supervision must take the same training courses that their employees take. Be sure that employees receive refresher training as required.
- Ensure that all employees, whether new-hires, or highly trained and experienced must be instructed in the safe operation and performance of their work activity.
- Ensure that the proper documentation of training and On the Job Training is performed and maintained. Documentation of training is critical to show compliance with these training requirements

Employees

- The following list includes annual training topics employees are required to take as determined by their supervisor:
- Hazardous Materials/Waste
- Annual Employee Safety and Hazardous Communication Information
- Toxic and Hazardous Substances
- Hearing Conservation
- Personal Protective Equipment
- Special Training Requirements

All training materials and training records will be provided for NASA review upon request.

APPENDIX A - ACRONYMS

AVL	Approved Vendor List
BEARP	Building Emergency Action and Recovery Plan
BEM	Building Emergency Manager
CESH	Corporate Environment, Safety and Health
CFR	Code of Federal Regulations
COTS	Commercial Off The Shelf
CPA	Corporate Purchasing Agreement
CPS	Corporate Policy Statement
CSE	Confined Space Entry
CSP	Contractor Safety Program
ECO	Engineering Change Order
EMP	Enterprise Management Policies
EPA	Environmental Protection Agency
ERT	Emergency Response Team
ESC	Executive Safety Committee
ESH	Environment, Safety, and Health
FP	Functional Procedure
GLM	Geostationary Lightning Mapper
GSFC	Goddard Space Flight Center
HAZWOPER	Hazardous Waste Operations and Emergency Response
HOP	Hazardous Operations Permit
HWP	Hot-Work Permit
IDR	Interim Discrepancy Report
JHA	Job Hazard Analysis
JHAW	Job Hazard Analysis Worksheet
LMS	Learning Management System
LMSSC	Lockheed Martin Space Systems Company
LMSII	Lockheed Martin Standards Injury & Illness
MSDS	Material Safety Data Sheet
NASA	National Aeronautics and Space Administration
OJT	On-the-Job Training
OSHA	Occupational Safety and Health Administration
OSH	Occupational Safety & Health Standard
OSO	Occupational Safety Office
PEL	Permissible Exposure Limit
PEP	Performance Evaluation Profile
PHI	Potentially Hazardous Item
PPE	Personal Protective Equipment
PSO	Program Safety Officer
RAC	Risk Assessment Code
RCRA	Resource Conservation and Recovery Act
RFP	Request for Proposal
SH	Safety and Health
SME	Subject Matter Expert

SSE	System Safety Engineering
TSCA	Toxic Substance Control Act
TSD	Transportation, Storage, and Disposal
TPS	Test Preparation Sheet